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USDA • Forest Service

# forest insect & disease management methods application group

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FDSTA

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## NEWSLETTER

### WESTERN SPRUCE BUDWORM EGG MASS SURVEYS

The Western Spruce Budworm Egg Mass-Defoliation Working Group has completed its objectives and has been disbanded. The Group was formed in 1976 to standardize egg mass sampling and defoliation description, and to improve models for predicting defoliation based on egg mass counts.

Standard data collection procedures were developed early in the program and have been used by Regions 1, 2, 3, 4, and 6 to develop one of the most extensive data bases of its type in existence. Nearly 1000 sample clusters have been sampled westwide since the summer of 1976, and over 4000 paired data sets consisting of egg mass densities and subsequent defoliation measurements are in the system.

Using this data base linear regression equations were computed for each Region by year as well as a combined equation for all of each Region's data. Correlation coefficients ( $R^2$ ) in most cases were below 0.5 with high Y-intercepts, and a tendency was noted for the correlation coefficients to be lower over time. Using the linear models, defoliation can be predicted correctly into 1 of 4 classes 50% of the time. Addition of physical attribute data collected under a CANUSA-West funded study and development of multiple regression equations improved correlation coefficients slightly. Additional analyses are planned before publication of the final report later this spring.

### DOUGLAS-FIR TUSsock MOTH PHEROMONE TRAPS ARE AVAILABLE

Two advances have been made toward implementation of the Douglas-fir tussock moth early warning system using pheromone traps developed by the USDA Expanded Douglas-fir Tussock Moth Research and Development Program.

Through the efforts of Eleanor Franz, MAG Administrative Technician, a contract was developed with the Sacramento Rehabilitation Facility to assemble the pheromone traps. The Rehab Facility is a non-profit organization that employs and trains retarded and handicapped persons to become useful and productive members of society. We have visited the facility to observe the operation and are very pleased with the quality of the finished products. The traps have now been delivered to MAG and we are ready to ship them to users on a request basis.

A standard data recording form has been developed and adopted westwide for use beginning this field season. As agreed to last November, these forms, when completed will be sent to FIDM/MAG for summarization and dissemination to all participants.

### PROGRESS ON ACQUISITION OF A GEOGRAPHIC INFORMATION SYSTEM

FIDM's proposal to acquire a commercial geographic information system has received technical review by the Washington Office Computer Technology Staff.

The next step in the process is review and approval by USDA. A revised version of the proposal has been submitted to the Computer Technology Staff to be forwarded to the Department.

Concurrently another evaluation of the Forest Service's geographic information system, RIDS\*POLY, will be conducted by FIDM/MAG and the Washington Office Computer Technology and Engineering staffs. The version of RIDS\*POLY at Washington State University will be evaluated using two years' of insect and disease infestation data from the Bitterroot National Forest in Region 1. Personnel from Regions 1 and 6 and the Intermountain Forest and Range Experiment Station will participate in the evaluation. Plans are being made to conduct this evaluation during May 1980.

#### AERIAL APPLICATION OF PESTICIDE IN SEED ORCHARDS EVALUATED

The Withlacoochee State Seed Orchard in central Florida was the site of a cooperative project designed to develop aerial application strategies for southern pine seed orchards. Jack Barry and Patti Kenney of FIDM/MAG represented one of 14 organizations from 10 states that participated in the project.

According to Harold Flake and Larry Barber of the Asheville, NC, FIDM Field Office, seed and cone insects may reduce seed production up to 30%. With present seed values approaching \$1000 a pound, the need to reduce insect-caused losses is readily apparent.

Orchard sprayers, which have been used in the past, result in a high percentage of spray being deposited on the orchard floor or in the lower two-thirds of the tree, while most cones are in the upper third of the crown. In addition, it requires approximately a month to spray a large seed orchard with ground

equipment, which makes it difficult to time applications with the most susceptible stage of the target insect. Also, applicators are exposed to pesticides for a long time. Aircraft applications, by contrast, can cover a seed orchard in a matter of hours.

For the first time, the Cramer/Barry/Grim Forest Spray Model, developed by the H.E. Cramer Co. of Salt Lake City, was used to plan and develop spray strategy and predict the amount of drift resulting from aerial sprays. Bob Ekblad of the Forest Service's Missoula Equipment Development Center coordinated participation by NASA and assisted in meteorological evaluations.

Data are now being analyzed by MAG, NASA, and H.E. Cramer Co.. Preliminary results suggest that both fixed wing aircraft and helicopters can give excellent coverage of seed orchards. When the data are completely analyzed they may show that aerial application is more efficient, less costly, and safer than ground application techniques.

#### TURBO THRUSH CHARACTERIZED FOR Bt TANK MIXES

A team of specialists representing PNW, Regions 2, 3, and 5, and MAG characterized spray atomization of several commercial tank mixes of the bacterial insecticide Bacillus thuringiensis (Bt) with a Marsh Turbo Thrush. A series of 44 spray trials were conducted at Litchfield, AZ, during March to obtain data on the performance of the Turbo Thrush with different nozzle types in preparation for a CANUSA-sponsored field experiment with Bt on the Kaibab National Forest in northern Arizona. Deposit samples are being analyzed on the Quantimet at the University of California at Davis by Patti Kenney of MAG. From this evaluation, a decision will be forthcoming on the nozzle type, size, and orientation



*Stearman spray aircraft applying spray to seed orchard trees.*

*Meteorological instruments being set up for spray trials at the Withlacoochee Seed Orchard, Florida.*



required to achieve the desired droplet size for pesticides applied by the Turbo Thrush.

#### IDAHO FOREST SURVEY WILL COLLECT INSECT AND DISEASE LOSS DATA

A pilot evaluation has been initiated in Idaho to collect data on the incidence of important insect and disease pests using the Resources Evaluation process. Regions 1 and 4 FIDM units and MAG will be cooperating with the INT Renewable Resources Evaluation (RRE) unit headed by Dwane Van Hooser. The Timber Inventory staff in each Region will be consulted as the project progresses.

FIDM will train RRE crews in the recognition and evaluation of selected forest insects and diseases. Data will be gathered for these pests over the next two years by these crews. Supplemental data for pests that are difficult to recognize or evaluate will be collected by FIDM and will be published jointly with the RRE data. These data will be compatible with the Forest Insect and Disease Information System, and will be available to FIDM prior to publication if necessary. This is an attempt to establish lines of cooperation similar to those that exist between the Asheville, NC, FIDM Field Office and the RRE unit of the Southeastern Forest Experiment Station.

#### COST COMPARISON BETWEEN CONVENTIONAL AND OPTICAL BAR MULTISTAGE SURVEYS FOR MOUNTAIN PINE BEETLE LOSS ASSESSMENT

During 1978 and 1979, the Northern Region (R-1) FIDM staff and MAG cooperated in two multistage surveys to measure annual mortality of lodgepole pine caused by the mountain pine beetle in portions of the Beaverhead and Gallatin

National Forests in Montana. One survey used aerial sketchmapping and large-scale color aerial photography; the other used panoramic infrared photography taken from reconnaissance altitude by a U-2 aircraft. The results of the U-2 survey were reported in the last issue of this newsletter. The results were not readily comparable with the conventional survey because the U-2 survey covered a larger area and omitted a portion of the infested areas due to a navigational error. Since the U-2 survey was also a pilot project, more technical expertise and travel costs than normally required were involved. However, the overall standard errors for both surveys were quite similar.

Following these surveys, a separate cost analysis was conducted by Dayle Bennett, FIDM R-1, and the following costs noted: The conventional survey was estimated to have cost \$32,650, while the U-2 survey cost \$37,000, or 13% more than the conventional survey. The largest single cost difference between the two surveys was for film--\$3200 for the conventional survey and \$16,376 for the U-2 survey. One advantage of the U-2 survey was that it afforded almost complete coverage of the infestation and portions of each Forest, while the conventional photography covered only a very small area.

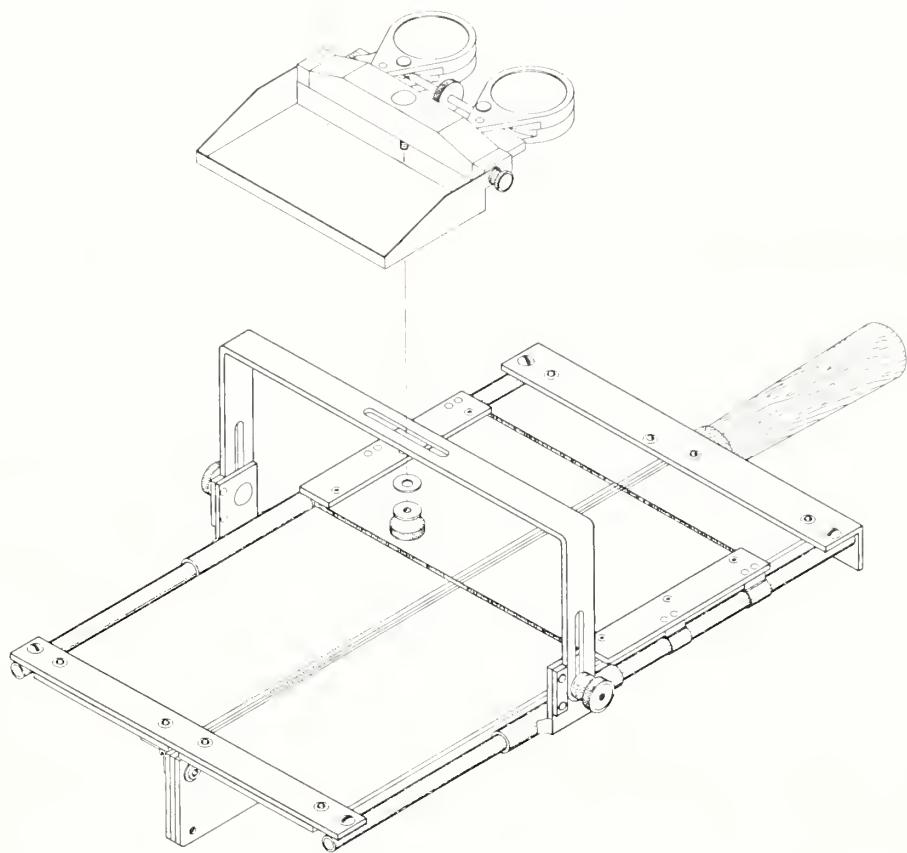
#### AN IMPROVED 9 x 9-INCH STEREOVIEWER

Commensurate with past multistage surveys to measure annual bark beetle damage, efforts have continued to improve the ground truth stage using color and color infrared transparencies. Portable stereo viewers that use reflected or indirect sunlight for illumination have been developed for 9 x 9-inch, 70 mm, and panoramic (5 x 50-inch) U2 photography. By far the most popular and time-tested viewer is the one for 9 x 9-inch transparencies.



*The 9 x 9-inch field stereo viewer. The viewer can be folded to fit into a daypack or cruiser's vest.*

*Drawing of the  
9 x 9-inch field  
stereo viewer.*



Beginning in 1976 with a jury-rigged prototype, this viewer has evolved through several stages of design and has been used on several surveys and projects in California, Idaho, Montana, Colorado, and Australia. The viewer is compact, lightweight, and can be operated with one hand. The film is held flat by a piece of clear plastic and the entire overlap region can be scanned from top to bottom by simply sliding the stereoscope along its tracks. Magnification can be adjusted from 2 to 4 power.

#### MAG STAFF ACTIVITIES

Jody Barnett has joined MAG as Clerk-Typist. Jody was previously assigned to the Cleveland National Forest as a Fire Control Technician.

Bill Ciesla and Bill Klein served as workshop moderators for the Western Forest Insect Work Conference in El Paso, TX, in March. Bill Ciesla's workshop dealt with criteria for decision making in aerial spray projects. Bill Klein's workshop dealt with the use of high altitude photography for mapping insect damage.

Dave Drummond gave a presentation entitled "Needs of the Forest Service for Remote Sensing to Detect Air Pollution Damage to Forests" at a special workshop sponsored by the California Remote Sensing Council in Berkeley, CA.

Bill Ciesla received a Presidential Citation from the American Society of Photogrammetry for serving as Program Chairman of the 7th Biennial Workshop on Color Aerial Photography in the Plant Sciences and Related Fields held in Davis in May 1979.

In January, John Wong and Jack Barry were invited speakers at the Douglas-fir Tussock Moth Technology Transfer Workshop in Portland. This workshop was sponsored by the Cooperative Extension Service of Washington State University. The workshop provided the opportunity for both John and Jack to share with researchers and users information on current activities MAG is involved in with the Technology Transfer process.

Bob Young and John Wong participated in the Simulation Modeling Workshop sponsored by the CANUSA-West Spruce Budworm Research and Development Program in January. The workshop provided the users with an excellent opportunity to provide input to the modeling effort, as well as getting an appreciation of the mechanics of formulating a complex simulation model.

Dave Drummond presented a lecture in December on the sources of plant pathogenic air pollutants to an EPA/University of Minnesota-sponsored course on Air Pollution Damage to Vegetation.

In January, Dave also presented a seminar to the Virginia Polytechnic Institute and State University Department of Plant Pathology Staff on assessment of insect- and disease-caused losses to forests over wide areas. He reviewed the pilot work on state-wide impact assessment for mountain pine beetle and dwarf mistletoe.

MAG PUBLICATIONS

Ciesla, W.M. and F.M. Yasinski. 1980. Forest insect and disease information system (FIDIS) implementation plan. USDA For. Serv., FIDM/MAG, Davis, CA. Rpt. No. 80-3.

Barry, J.W. 1980. Turbine-powered conventional agricultural aircraft--a new option for the forest manager. The World of Agricultural Aviation. 7:24-25, 39-40.

Hofacker, T., T. Smith, D. Graham, R. Sandquist, J. Barry and G. Blackwell. 1980. 1979 Douglas-fir tussock moth suppression projects. USDA For. Serv., Southwestern Region, FIDM, State and Private Forestry.

Dumbauld, R.K. C.R. Bowman, and J.E. Rafferty. 1980. Optimum swath widths and application rates for selected aircraft and meteorological regimes. USDA For. Serv., FIDM/MAG Davis, CA. Rpt. No. 80-5. Under contract with H.E. Cramer Co., Inc., Salt Lake City, UT.

Klein, W.H., D.D. Bennett, and R.W. Young. 1980. Evaluation of panoramic reconnaissance aerial photography for measuring annual mortality of lodgepole pine caused by the mountain pine beetle. USDA For. Serv., FIDM/MAG, Davis, CA. Rpt. No. 80-2.



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